Claims

What is claimed is:

1. A device for treating a bone structure, comprising:

a first biocompatible rigid or semi-rigid member having a first common base and a first plurality of ribs extending along at least a longitudinal portion of the first common base;

a second biocompatible rigid or semi-rigid member having a common base and a second plurality of ribs extending along at least a longitudinal portion of the second common base;

wherein the device is configured to be placed in a collapsed state by engaging the first and second pluralities of ribs in an interposed arrangement, and configured to be placed in a deployed state by disengaging the first and second pluralities of ribs.

2. The device of claim 1, further comprising a coupling mechanism that couples the first and second members together.

3. The device of claim 2, wherein the coupling mechanism is a hinge.

4. The device of claim 1, wherein the first and second pluralities of ribs are flutes.

5. The device of claim 1, wherein the first and second members have a combined cross-sectional profile, and each of the first and second members has an individual cross-sectional profile, the combined cross-sectional profile being substantially the same as the individual cross-sectional profile.

6. The device of claim 1, wherein the first and second members have a combined cross-sectional circular profile, and each of the first and second members has a respective individual cross-sectional arcuate profile, the combined cross-

sectional profile having a radius that is substantially equal to a radius of curvature of the individual cross-sectional profile.

7. The device of claim 1, wherein the first and second members are sized to fit within a vertebra.

8. A method of treating a bone structure having opposing sides and a compression fracture therebetween, the method comprising:

providing a device with first and second members, each of which has a common base and a plurality of ribs extending along at least a longitudinal portion of the respective common base;

placing the device in a collapsed state by engaging the ribs of the respective first and second members in an interposed arrangement;

introducing the device within the bone structure while in the collapsed state;

placing the device in a deployed state by disengaging the ribs of the respective first and second members, wherein the first and second members move in opposite directions to displace the opposing sides of the bone structure in opposite directions.

9. The method of claim 8, wherein the device is placed in the respective collapsed and deployed states by hinging the first and second members relative to each other.

10. The method of claim 8, wherein the first and second pluralities of ribs are flutes.

11. The method of claim 8, wherein the first and second members have a combined cross-sectional profile, and each of the first and second members has an individual cross-sectional profile, the combined cross-sectional profile being substantially the same as the individual cross-sectional profile.

12. The method of claim 8, wherein the first and second members have a combined cross-sectional circular profile, and each of the first and second members has a respective individual cross-sectional arcuate profile, the combined cross-sectional profile having a radius that is substantially equal to a radius of curvature of the individual cross-sectional profile.

13. The method of claim 8, wherein the bone structure is a vertebral body.

14. The method of claim 8, wherein the device is deployed until the compression fracture has been completely reduced.

15. The method of claim 8, further comprising introducing treatment medium into the bone structure after deployment of the device within the bone structure.

16. The method of claim 8, further comprising stabilizing the bone fracture.

17. A device for treating a bone structure, comprising:

first and second proximal biocompatible member portions;

first and second distal biocompatible member portions;

a first intermediate hinge located between the respective proximal and distal member portions, wherein a first hinge point is formed;

a second intermediate hinge located between the respective proximal and distal member portions, wherein a second hinge point is formed; and

an actuating coupling assembly configured for displacing proximal ends of the first and second proximal member portions and distal ends of the first and second distal member portions towards each other, whereby the first and second hinge points are respectively displaced outward away from each other to deploy the device.

18. The device of claim 17, wherein the coupling assembly is configured for displacing the proximal ends of the first and second proximal member portions and the distal ends of the first and second distal member portions away from each other, whereby the first and second hinge points are respectively displaced inward towards each other to collapse the device.

19. The device of claim 17, wherein the coupling assembly comprises a drive shaft, a proximal coupling mechanism coupled to the drive shaft, and a distal coupling mechanism coupled to the drive shaft, the device further comprising proximal hinges between the respective proximal member portions and the proximal coupling mechanism, and distal hinges between the respective distal members portions and the distal coupling mechanism.

20. The device of claim 19, wherein the drive shaft is a drive screw, and the proximal coupling mechanism comprises a nut in which the drive screw is threadedly engaged.

21. The device of claim 19, wherein the drive shaft is a shear wire and the proximal coupling mechanism is an annular ring through which the shear wire is slidably engaged.

22. The device of claim 21, wherein the shear wire comprises a weakened region that causes the shear wire to break after the device has been fully deployed.

23. The device of claim 19, wherein the distal coupling mechanism is a spherical cap that houses a distal end of the drive shaft.

24. The device of claim 17, wherein the first proximal and distal member portions form separate members, and the second proximal and distal member portions form separate members.

25. The device of claim 17, wherein the first proximal and distal member portions form a single member, the second proximal and distal member portions form a single member, and the first and second intermediate hinges are living hinges.

26. The device of claim 17, further comprising:

a first central biocompatible member portion located between the first proximal and distal member portions, wherein the first intermediate hinge is located between the first proximal member portion and the first central member portion;

a second central biocompatible member portion located between the second proximal and distal member portions, wherein the second intermediate hinge is located between the second proximal member portion and the second central member portion;

a third intermediate hinge located between the first distal member portion and the first central member portion; and

a fourth intermediate hinge located between the second distal member portion and the second central member portion;

whereby the first and second central member portions are respectively displaced outward away from each to deploy the device when the actuating coupling assembly displaces the proximal ends of the first and second proximal member portions and the distal ends of the first and second distal member portions towards each other.

27. The device of claim 17, wherein each of the member portions comprises a common base and a plurality of ribs extending along at least a longitudinal portion of the common base, wherein the device is configured to be placed in a collapsed state by engaging the respective pluralities of ribs of the first

proximal and distal member portions in an interposed arrangement and engaging the respective pluralities of ribs of the second proximal and distal member portions in an interposed arrangement, and wherein the device is configured to be placed in a deployed state by disengaging the respective pluralities of ribs of the first proximal and distal member portions and disengaging the respective pluralities of ribs of the second proximal and distal member portions.

28. The device of claim 17, wherein the member portions are sized to fit within a vertebra.

29. The device of claim 17, further comprising a cannula configured for controllably engaging the actuating coupling assembly.

30. The device of claim 17, further comprising a driver configured for operating the actuating coupling assembly.